

What is claimed is:

1. A tool roll comprising:

a cylindrical base roll comprising first and second ends spaced apart along a longitudinal axis;

5 a first wire comprising a plurality of first voids formed therein, the first wire being wound in helical coils around the base roll, wherein the plurality of first voids in the first wire form a plurality of first cavities, each cavity of the plurality of first cavities comprising an opening at an outer surface of the tool roll;

10 wherein a distance between the first wire and a reference plane transverse to the longitudinal axis of the base roll sequentially increases and decreases at least once when moving in one direction about a circumference of the base roll.

15 2. A tool roll according to claim 1, wherein the distance between the first wire and the reference plane sequentially increases and decreases two or more times when moving in one direction about the circumference of the base roll.

20 3. A tool roll according to claim 1, wherein the distance between the first wire and the reference plane sequentially increases and decreases in a uniform pattern when moving in one direction about the circumference of the base roll.

4. A tool roll according to claim 1, wherein the distance between the first wire and the reference plane sequentially increases and decreases in a non-uniform pattern when moving in one direction about the circumference of the base roll.

25 5. A tool roll according to claim 1, wherein the first wire forms a sinusoidal helical pattern about the circumference of the roll.

6. A tool roll according to claim 1, further comprising a second wire wound around the base roll, wherein the second wire is located between adjacent helical coils of the first wire.

7. A tool roll according to claim 6, wherein the second wire comprises two opposing side walls, an inner edge facing the base roll and an outer edge facing outward from the base roll, and further wherein at least one of the two opposing side walls comprises a surface texture.

5 8. A tool roll according to claim 1, further comprising a wire winding surface proximate the first end of the base roll, wherein the first wire conforms to a profile of the first wire winding surface.

9. A tool roll according to claim 1, wherein the first wire comprises two opposing side walls, an inner edge facing the base roll and an outer edge facing outward from the base roll, and further wherein at least one of the two opposing side walls comprises a surface texture.

10. A tool roll comprising:

a cylindrical base roll comprising first and second ends spaced apart along a longitudinal axis;

a first wire comprising a plurality of first voids formed therein, the first wire being wound in helical coils around the base roll;

a second wire wound around the base roll, wherein the second wire is located between adjacent helical coils of the first wire;

wherein the second wire and the plurality of first voids in the first wire form a plurality of first cavities, each cavity of the plurality of first cavities comprising an opening at an outer surface of the tool roll;

and wherein a distance between the first wire and a reference plane transverse to the longitudinal axis of the base roll sequentially increases and decreases at least once when moving in one direction about a circumference of the base roll.

11. A tool roll according to claim 10, wherein the distance between the first wire and the reference plane sequentially increases and decreases two or more times when moving in one direction about the circumference of the base roll.

12. A tool roll according to claim 10, wherein the distance between the first wire and the reference plane sequentially increases and decreases in a uniform pattern when moving in one direction about the circumference of the base roll.

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13. A tool roll according to claim 10, wherein the distance between the first wire and the reference plane sequentially increases and decreases in a non-uniform pattern when moving in one direction about the circumference of the base roll.

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14. A tool roll according to claim 10, wherein the first wire forms a sinusoidal helical pattern about the circumference of the roll.

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15. A tool roll according to claim 10, wherein the first wire comprises two opposing side walls, an inner edge facing the base roll and an outer edge facing outward from the base roll, and further wherein at least one of the two opposing side walls comprises a surface texture.

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16. A tool roll according to claim 10, wherein the second wire comprises two opposing side walls, an inner edge facing the base roll and an outer edge facing outward from the base roll, and further wherein at least one of the two opposing side walls comprises a surface texture.

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17. A method of forming a structured surface on an article, the method comprising:
providing a tool roll comprising a cylindrical base roll comprising first and second ends spaced apart along a longitudinal axis, a first wire comprising a plurality of first voids formed therein, the first wire being wound in helical coils around the base roll, wherein the plurality of first voids in the first wire form a plurality of first cavities, each cavity of the plurality of first cavities comprising an opening at an outer surface of the tool roll, wherein a distance between the first wire and a reference plane transverse to the longitudinal axis of the

base roll sequentially increases and decreases at least once when moving in one direction about a circumference of the base roll;

contacting a moldable material to the outer surface of the tool roll to form the structured surface using the outer surface of the tool roll, the moldable material at least partially filling at least some of the first cavities; and

removing the structured surface from the outer surface of the tool roll, wherein the structured surface comprises a plurality of protrusions corresponding to the plurality of first cavities.

18. A method according to claim 17, wherein the distance between the first wire and the reference plane sequentially increases and decreases two or more times when moving in one direction about the circumference of the base roll.

19. A method according to claim 17, wherein the distance between the first wire and the reference plane sequentially increases and decreases in a uniform pattern when moving in one direction about the circumference of the base roll.

20. A method according to claim 17, wherein the distance between the first wire and the reference plane sequentially increases and decreases in a non-uniform pattern when moving in one direction about the circumference of the base roll.

21. A method according to claim 17, wherein the first wire forms a sinusoidal helical pattern about the circumference of the roll.

22. A method of forming a structured surface on an article, the method comprising:
providing a tool roll comprising a cylindrical base roll comprising first and second ends spaced apart along a longitudinal axis, a first wire wound in helical coils around the base roll, wherein a distance between the first wire and a reference plane transverse to the longitudinal axis of the base roll sequentially increases and decreases at least once when

moving in one direction about a circumference of the base roll, a second wire wound in helical coils around the base roll, wherein the second wire is located between adjacent helical coils of the first wire, and wherein the helical coils of the first and second wires alternate along the longitudinal axis, and further wherein a height of the first wire above the base roll is less than a height of the second wire above the base roll, whereby a helical groove is formed on an outer surface of the tool roll, the helical groove conforming to the shape of the first wire;

contacting a moldable material to the outer surface of the tool roll to form a structured surface on an article using the outer surface of the tool roll, the moldable material at least partially filling at least a portion of the helical groove formed by the first and second wires; and

removing the structured surface from the tool roll, wherein the structured surface comprises a series of ridges.

23. A method according to claim 22, wherein the helical groove is substantially continuous about and along the outer surface of the tool roll.

24. A method according to claim 22, wherein the distance between the first wire and the reference plane sequentially increases and decreases two or more times when moving in one direction about the circumference of the base roll.

25. A method according to claim 22, wherein the distance between the first wire and the reference plane sequentially increases and decreases in a uniform pattern when moving in one direction about the circumference of the base roll.

26. A method according to claim 22, wherein the distance between the first wire and the reference plane sequentially increases and decreases in a non-uniform pattern when moving in one direction about the circumference of the base roll.

27. A method according to claim 22, wherein the first wire forms a sinusoidal helical pattern about the circumference of the roll.

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